UNITED STATES PATENT AND TRADEMARK OFFICE

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10/562,555	12/28/2005	Yutaka Murakami	L9289.05195	8225

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 July 2010</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>33-46</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>33-46</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>07/22/10</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

1.   This office action is in response to communication filled (RCE) on

04/05/10. Claims 23-46 are pending on this application. Previously allowed

claim 33 withdrawn.

2.   Applicant's arguments with respect to claims 1-4, 6-7, 9-15, 17 and

19-20 have been fully considered but are moot in view of the new ground(s)

of rejection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   **Claims 33- 37 and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable**

over Wu (US 2002/012383).

5.   As per claim 33, Wu a radio communication system, comprising a

transmission apparatus with a plurality of antennas and a reception

apparatus that receives signals transmitted from the plurality of antennas of

the transmission apparatus, the reception apparatus comprising: a channel

fluctuation estimation section that estimates a channel fluctuation about the

signals transmitted from the plurality of antennas of the transmission

apparatus (Wu, Fig. 7 item "Channel estimation"); a transmission method

requesting section that selects one of a first transmission method of

transmitting a plurality of signals representing the same data from the

plurality of antennas (Wu, Fig. 3 item $S_k(1)$, $S_k(2)$, $-S_k*(2)$, $S_k*(1)$, Para [0024]

"The receiver then reports … time diversity or spatial diversity …") and a

second transmission method of transmitting a plurality of signals

representing varying data from the plurality of antennas (Wu, Fig. 4 item

$S_k(1)$, $S_k(2)$, $S_k(3)$, $S_k(4)$, Para [0024] "The receiver then reports … time

diversity or spatial diversity …"), based on the estimated channel fluctuation

(Wu, Para [0024] "… channel estimation … After the channel information …

The controller then determines …"), and sends a request for the selected

transmission method to the transmission apparatus (Wu, Para [0024] "The

receiver then reports … time diversity or spatial diversity …"); a modulation

scheme requesting section that selects one of a plurality of modulation

schemes based on the estimated channel fluctuation and sends a request for

the selected modulation scheme to the transmission apparatus (Wu, Para

[0036] "A receiver feedback to provide feed back signals to the adaptive

coding of modulation ..." Para [0047], – wherein since it is adaptive and a

particular modulation scheme need to be selected, it is obvious to have a

modulation determination section); and a control section that controls

whether or not to send the requests from the transmission method

requesting section and the modulation scheme requesting section, according

to procedures of communication with the transmission apparatus (Wu, Para

[0024] "... controller ... "), and the transmission apparatus comprising: a

generation section that generates signals corresponding to the transmission

method requested from the reception apparatus (Wu, Fig. 1 item "Adaptive

space Time Diversity"; and a transmission processing section that modulates

the signals generated in the generation section according to the modulation

scheme requested from the reception apparatus (Wu, Fig. 1 item "Adaptive

Coding & Modulation"), and transmits the modulated signals from the

antennas (Wu, Fig. 1 item "antenna".

6.   As per claim 34, Wu teaches a transmission apparatus comprising: a

plurality of transmission antennas (Wu, Fig. 1 "antenna"); a frame

generation instruction section that outputs a frame generation instruction

signal including a symbol reporting a transmission method of transmission

signals (Wu, Fig. 1 "STTD/SM Assignment" "Adaptive Coding & Modualtion");

a data sequence generation section that outputs one of a first data sequence

comprising a plurality of signals representing the same data and (Wu, Fig. 3

item $S_k(1)$, $S_k(2)$, $-S_k*(2)$, $S_k*(1)$, Fig. 1 item "STTD/SM OFDM Encoder") a

second data sequence comprising a plurality of signals representing varying

data, according to the frame generation instruction signal (Wu, Fig. 4 item

$S_k(1)$, $S_k(2)$, $S_k(3)$, $S_k(4)$, Fig. 1 item "STTD/SM OFDM Encoder"); and a

transmission processing section that transmits the first data sequence or the

second data sequence from the plurality of antennas (Wu, Fig. 1 item

"Antenna". Furtherrmore it is well known in the art transmitter has a

transmission section in order to transmit the desired data to transmit to the

desired destination with the desired sequence as discussed in Para [0024]

"... transmission ... with either time diversity or spatial diversity).

7.   As per claim 35, Wu teaches the transmission apparatus according to

claim 34, wherein: the signals transmitted from the plurality of antennas are

transmitted as an orthogonal frequency division multiplexing (OFDM) signal

(Wu, Para [0003] "OFDM"); and the first data sequence or the second data

sequence is mapped to at least two of a plurality of subcarriers forming the

OFDM signal (Wu, Fig. 3 item $S_k(1)$, $S_k(2)$, $-S_k*(2)$, $S_k*(1)$, Fig. 4 item $S_k(1)$, $S_k(2)$,

$S_k(3)$, $S_k(4)$.

8.   As per claim 36, Wu teaches the transmission apparatus according to claim 34, further comprising: a modulation section that selects a modulation scheme for modulating the transmission data of the first or second data sequence from a plurality of modulation schemes, and modulates the transmission data using the modulation scheme selected (Wu, "Adaptive Coding & Moduation" " … Modulator"), wherein a modulation scheme to apply to the first data sequence and a modulation scheme to apply to the second data sequence have the same maximum M-ary modulation index value (Wu, "Adaptive Coding & Moduation" " … Modulator" – wherein it is adaptive as desired).

9.   As per claim 37, Wu teaches the transmission apparatus according to claim 34, further comprising: a modulation section that selects a modulation scheme for modulating the transmission data (Wu, "Adaptive Coding & Moduation" " … Modulator") of the first or second data sequence (Wu, Fig. 3 item $S_k(1)$, $S_k(2)$, $-S_k^*(2)$, $S_k^*(1)$, Fig. 4 item $S_k(1)$, $S_k(2)$, $S_k(3)$, $S_k(4)$) from a plurality of modulation schemes, and modulates the transmission data using the modulation scheme selected (Wu, "Adaptive Coding & Moduation" " … Modulator"), wherein for the modulation scheme, at least one of the plurality

of modulation schemes is selected while the first data sequence or the

second data sequence is transmitted (Wu, "Adaptive Coding & Moduation" "

… Modulator" – wherein while the transmitter transmitting the selected data

sequence, the "Adaptive Coding & Moduation" determines the modulation for

the next transmission since it is adaptive not fixed.).

10.   As per claim 39, Wu teaches the transmission apparatus according to

claim 34, wherein the transmission processing section uses an eigen-mode,

in which one of a singular vector and an eigen vector of a channel matrix is

used as a channel signature vector, as a method for transmitting the second

data sequence (Wu, Para [0024], [0021]).

11.   As per claim 40, Wu teaches the transmission apparatus according to

claim 36, wherein the transmission processing section uses an eigenmode, in

which one of a singular vector and an eigen vector of a channel matrix is

used as a channel signature vector (Murakami, Para [0081]), as a method

for transmitting the second data sequence (Wu, Para [0024], [0021]).

12.   As per claim 41, Wu teaches the transmission apparatus according to

claim 37, wherein the transmission processing section uses an eigen mode

(Murakami, Para [0081]), in which one of a singular vector and all eigen

vector of a channel matrix is used as a channel signature vector, as a method for transmitting the second data sequence (Wu, Para [0024], [0021]).

13. As per claim 42, Wu teaches the transmission apparatus according to claim 34, wherein the data sequence generation section switches the first data sequence and the second data sequence according to the number of communicating parties (Wu, Para [0024], Para [0022] " ... on statistical analysis of communication traffic demands").

14. As per claim 43, Wu teaches a reception apparatus comprising: a transmission method determining section that selects one of a first transmission method of transmitting a plurality of signals representing the same data from a plurality of antennas and (Wu, Para [0024] "The receiver then reports ... time diversity or spatial diversity ...", Fig. 3 item $S_k(1)$, $S_k(2)$, -$S_k^*(2)$, $S_k^*(1)$) a second transmission method of transmitting a plurality of signals representing varying data from the plurality of antennas (Wu, Para [0024] "The receiver then reports ... time diversity or spatial diversity ...", Fig. 4 item $S_k(1)$, $S_k(2)$, $S_k(3)$, $S_k(4)$); a modulation scheme determining section that selects one of a plurality of modulation schemes (Wu, Para [0036] "A receiver feedback to provide feed back signals to the adaptive coding of

modulation ..."); a control section that controls whether not to select the

transmission method and the modulation scheme in the transmission

method determining section (Wu, Para [0024] "controller") and the

modulation scheme determining section according to procedures of

communication with a communicating party (Wu, Para [0036] "A receiver

feedback to provide feed back signals to the adaptive coding of modulation

..." – wherein since it is adaptive and a particular modulation scheme need to

be selected, it is obvious to have a modulation determination section); and

a requesting section that conveys a request for the selected transmission

method and modulation scheme to the communicating party (Wu, Para

[0024] "The receiver then reports ... time diversity or spatial diversity ...",

Para [0036] "A receiver feedback to provide feed back signals to the

adaptive coding of modulation ...").

15.   As per claim 44, Wu teaches the reception apparatus according to

claim 43, wherein the control section performs control such that, while data

is received, the transmission method determining section does not select the

transmission method and the modulation scheme determining section alone

selects the modulation scheme (Kim, Para [0047] "controller").

16.   As per claim 45, Wu teaches the reception apparatus according to

claim 43, further comprising: a channel estimation section that estimates at

least one of a channel of received signals (Wu, Para [0024] "The receiver

side will estimate the channel ...") and a reception field intensity of the

received signals (Wu, Para [0035] "... signal to noise power ratio"), wherein

the transmission method determining section selects the transmission

method based on the estimation result in the channel estimation section

(Wu, Para [0024] "... channel estimation ... After the channel information ...

The controller then determines ...").

17.   As per claim 46, Wu teaches the reception apparatus according to

claim 43, wherein a modulation scheme to apply to the first data sequence

and a modulation scheme to apply to the second data sequence have the

same maximum M-ary modulation index value (Wu, "Adaptive Coding &

Moduation" " ... Modulator ... " – wherein it is adaptive as desired).

18.   Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (US

2002/012383) in view of Paulraj (US 6377632).

19.   As per claim 38, Wu teaches the transmission apparatus according to

claim 34 (see claim 34).

20.   Wu does not explicitly teach wherein the data sequence generation

section cyclically ships data represented by at least one of the plurality of

signals included in the first data sequence or the second data sequence by a

predetermined period of time. **Paulraj** teaches teach wherein the data

sequence generation section cyclically ships data represented by at least one

of the plurality of signals included in the first data sequence or the second

data sequence by a predetermined period of time (It is well known in the art

to perform cyclical shift because it provides coding and diversity gain. –see

US 6377632 Col 5 L51 – Col 6 L1-5). Thus, it would have been obvious to

one having ordinary skill in the art to implement the instant limitation as

taught by Paulraj because Paulraj teaches the benefit of implementing the

instant limitation because it provides coding and diversity gain).

21.   Claims 23-32 are similarly analyzed as claims 34-42.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ZEWDU KASSA whose telephone number is (571)270-5253.

The examiner can normally be reached on Monday - Friday (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Fan Chieh can be reached on 571 272 3042. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zk

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611